

# Cigar-box Charkha

by Marilyn Rishel Sult



*You can always find a friend to get you into trouble.*

**trouble.** 1. To cause mental agitation, worry, harass, perturb, or vex. 2. To cause difficulty or inconvenience.

My friend Mary Wilson told me her charkha needed some work, so I went to look at it. I decided the cotton drive bands were making it vibrate too much, and replaced them with O-ring material. Anyone who owns an imported charkha can make it run more smoothly by replacing the belts this way. You'll need two drive belts of different diameters. The large one con-

nects the large wheel with the pulley on the bottom of the small wheel. The small one connects the small wheel to the spindle pulley. Measure the length of O-ring material you'll need and cut the stuff on an angle, so you'll have more surface area for supergluing the joint. Pay attention; there will be a quiz later. Mary's problem was solved, but now I wanted a charkha.

My husband made me one out of black cherry. It is beautiful. It has amber for the driving knob and for the spindle pulley. I was in love.

Then I started wondering how someone like me, without a lot of woodworking

*Marilyn made one-box (back, disassembled for carrying) and two-box (front, set for spinning) charkhas from cigar boxes.*

skills, could make a charkha. The box would be the hardest part, because it has to be square. I'm not very good at square.

**square. 1.** Having four equal sides and four right angles. **2.** More or less cubical, rectangular, and three-dimensional, as a box.

Okay, what kind of existing box could I use? How about cigar boxes? The news agency where I indulge my magazine addiction sells cigars. I asked Dean what she does with the boxes; she sells them, for a dollar each. Thinking I needed two boxes that were the same, I bought her supply and then went to more cigar stores. I ended up with twenty boxes, none of which matched.

I changed my mind and thought I would use one of the larger boxes, putting the whole charkha mechanism in the same box. If you follow my idea, you'll need a box at least 2 inches (5 cm) deep. My box is also 7¼" wide and 11" long, measured to the outside edges (18 by 28 cm). Cigar boxes seem to be made of ¼" (6 mm) stock; the insides were 1¾" (4.4 cm) deep, 6¾" (17 cm) wide, and 10½" (26.7 cm) long.

This project can be made completely by hand, but it's a lot faster with power tools. If you know someone who has stuff like a drill press, sander, grinder, and other tools, visit them.

## The case

I made a one-box charkha and a two-box charkha. The layouts are illustrated here.

The box has to be big enough to fit the large (driving) wheel, with some clearance on the sides (1/2"/1.25 cm or so). The small wheel can be mounted so it overlaps the edges. It lifts off its post for storage. You'll be happiest if your box has enough open space after the large wheel is installed for you to carry the small wheel, your spindle(s), extra rubberbands, and some fiber.

The lid of your box needs to be deep enough to close with all the parts inside. Ideally, you'll leave the large wheel in place for storage, which means the lid needs to clear the driving knob. On one of my charkhas, I filed down the knob to get this to work.

For a two-box charkha, take the tops off the boxes and use hinges to connect the two bottoms into a box with two deep

halves. It's hard to find small enough screws to attach the hinges. After fitting the hinges, I removed the screws and cut off their tips before installing them permanently.

Most of my description will refer to the one-box charkha. On the two-box version, the mounting blocks and spindle holder need to be longer because the box is deeper.

## The wheels, part 1

Charkhas are meant to rotate pretty fast, so there are two wheels. The large one is the driving wheel. My large wheels are 4½ to 5" (11.5 to 13 cm) in diameter. Make sure your large wheel fits inside your box with enough clearance to turn comfortably.

The small wheel has two sections: the one you see, on top, that drives the spindle, and the part you don't see, underneath, which is driven by the big wheel. For the smaller part underneath, I like to use

☞ **a spool from buttonhole-twist or silk thread**

although you can also cut a small wooden spool (for regular thread) in half.

## Tools needed

*This is the minimum. Use more or fancier if you have them.*

- coping saw
- hacksaw
- drill and bits: 15/64", 3/16", and 1/8" (approx. 59, 47, and 31 mm)
- screwdrivers
- ruler
- sandpaper
- needle file
- pliers
- clothespins, or small wood clamps
- something to drill very straight holes with (drill press, woodworking friend, or a kid who takes shop)

## Materials needed

- cigar box(es)
- one 3/16" (5 mm) steel rod, length depends (a few inches should work)
- one 4" (10 cm) piece of 3/16" (5 mm) copper tubing (for refrigerators)
- one small drawer pull
- thin pieces of scrap wood: 1/8" (3 mm) stock, extra cigar boxes, paneling, or hollow-core-door skins
- more small scraps of wood
- one 2-ounce jar of waterbase sealer
- several shank-type buttons, 1/2 to 1½" (1.25–3.8 cm) across—these buttons have a metal shank running through them; cut off the shank and the button has a hole through it
- between one and three small hinges
- tiny springs or rubberbands
- two brass eye hooks, the smallest you can find
- O-ring material, two sizes\*
- one wooden spool—either from buttonhole twist or silk thread, or from regular thread (you'll have to cut this one in half)
- between one and three steel knitting needles, size 0 or 1 (2.25–2.5 mm)
- tacky or wood glue
- superglue

\* Marilyn's smaller band is 1/16" O-ring stock and her larger one is 3/32". See comments on O-ring stock on pages 79-80.

The large wheel and the upper part of the small wheel are made the same way, and you have choices. What you want is a wheel with a groove in it to carry the drive band.

*Easy way:* Back to the hobby store. Look for “basswood plaques.” Unfinished wood again. They’re milled with a narrow edge on what’s supposed to be the face. You need two for each wheel.

*Cheap way (also may be easier than shopping):* Make a “wheel sandwich.” Each wheel consists of three circles, cut from

🔧 **scrap wood, about 1/8–3/16" (3–5 mm) thick**

like basswood, pine, hardwood, extra cigar box pieces, paneling, or hollow-core-door skins. Two of the circles are the size of the finished wheel. The third has a smaller radius—by about 3/8" (9 mm) for the large wheel and about 1/8" (3 mm) for the small wheel. The difference between the circles makes the groove for the drive band. As long as the band fits, the depth of the groove isn’t critical.

*Examples:* For a large wheel, cut two 5" (13 cm) circles and one 4 1/4" (11 cm) circle. For a small wheel, cut two 3" (7.5 cm) circles and one 2 3/4" (7 cm) circle.

Sand the circles so they are smooth.

## Mounting posts, part 1

Each wheel sits on a post that sticks straight up from the base of the box. I used

🔧 **3/16" (5 mm) steel rod**

You’ll need two pieces, one for each wheel, but they won’t be very long. The center of each wheel is fitted with a sleeve that slides over the steel rod. I used

🔧 **3/16" (5 mm) (inner dimension) copper tubing (sold for refrigeration)**

## The wheels, part 2

Determine the *outer* dimension of your sleeve or copper tubing and select a drill bit to match. Mine was 15/64" (6 mm). Drill a hole in the exact center of each of the six circles you cut earlier (or the four basswood plaques). Make sure the hole in the spool matches; redrill it if necessary.

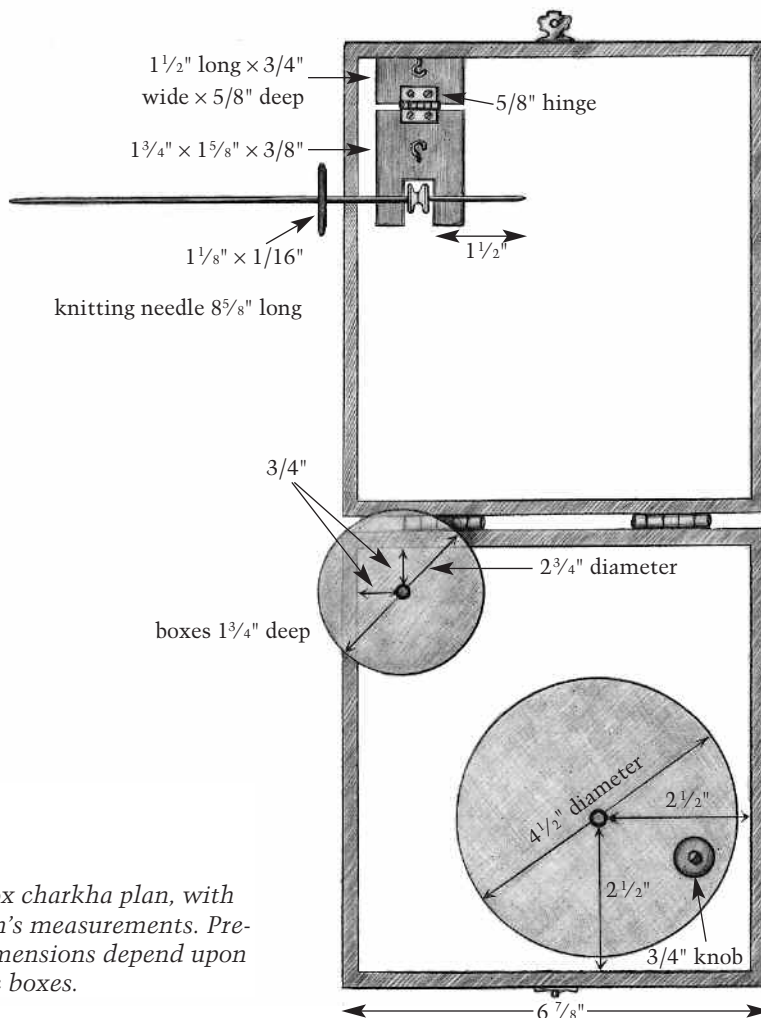
You need two lengths of copper tubing; here’s how to figure their sizes. For the large wheel, hold the three layers together and measure the thickness. Cut one piece of tubing to this length plus 1/8" (mine was 5/8"/1.6 cm). For the small wheel, do the same calculation and then *add* the thickness of the spool. Cut your second piece of tubing to this length (mine was 1 1/8"/2.8 cm).

Check the fit of the tubing on the steel rod. I needed to ream out my tubing slightly with a 3/16" (5 mm) drill bit, which I did by holding the tubing with a vise or pliers. File or sand the edges of the tubing until they’re smooth.

It’s time to glue together the plaques, or to make three-circle sandwiches. For sandwiches, start with the large wheel. Apply

🔧 **tacky glue or wood glue**

to both sides of the smaller circle. Place it in between the two larger circles and push the appropriate piece of copper tubing through the holes; this will center all of the pieces. For plaques or toy plates, glue the pieces together with their narrow sides facing and center with the tubing. Have the extra 1/8" (3 mm) of tubing extending



*Two-box charkha plan, with Marilyn’s measurements. Precise dimensions depend upon specific boxes.*

at the top of the sandwich. Wipe off excess glue with a damp paper towel and clamp the layers together with

**👉 clothespins or small wood clamps.**

If you use wood clamps, protect the surface of your wheels with something like cereal-box cardboard. Repeat the process with the small wheel, but put glue on one end of the spool and add it to the bottom of the sandwich. Make sure everything's centered. Let the wheels dry.

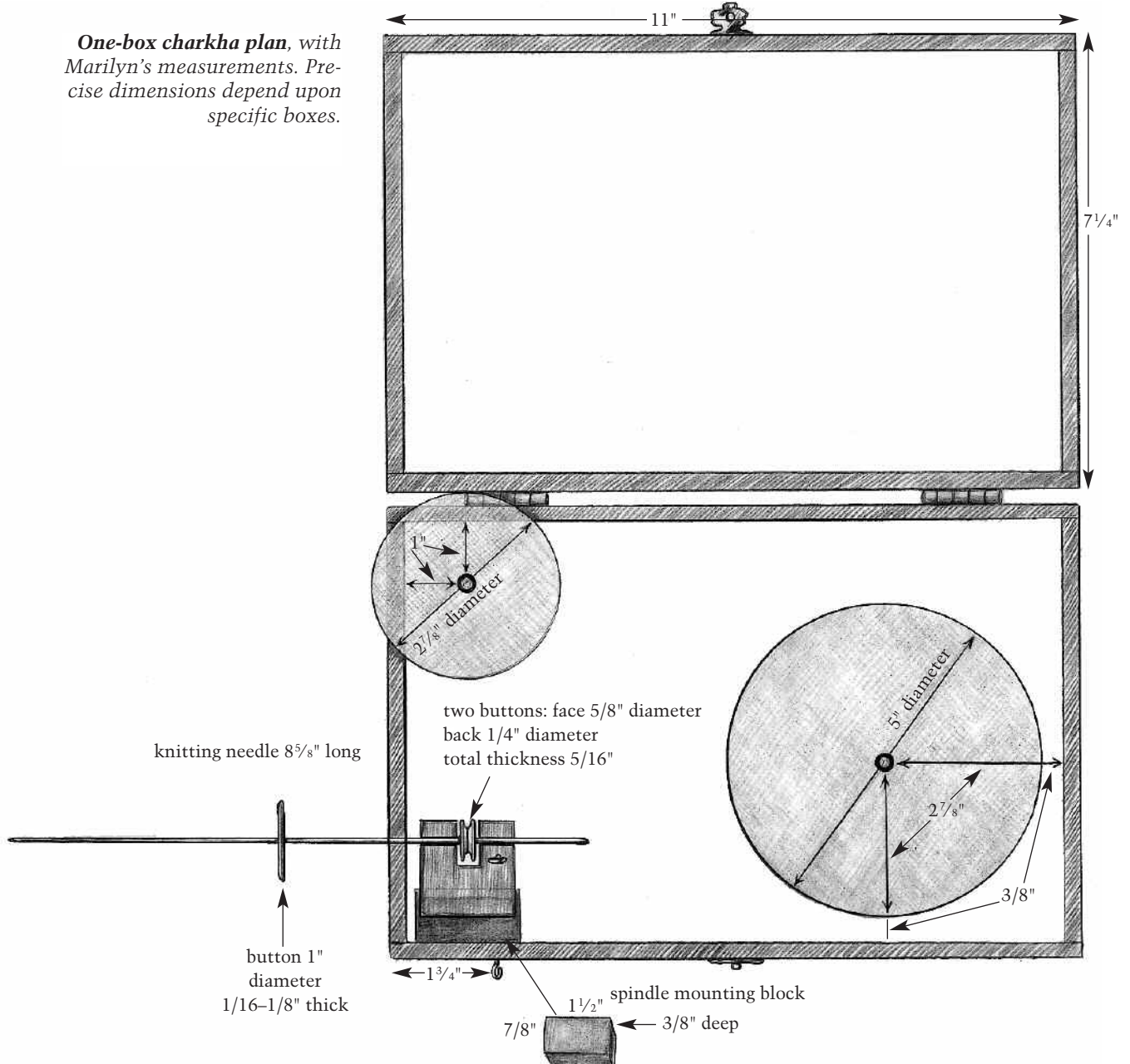
## Mounting posts, part 2

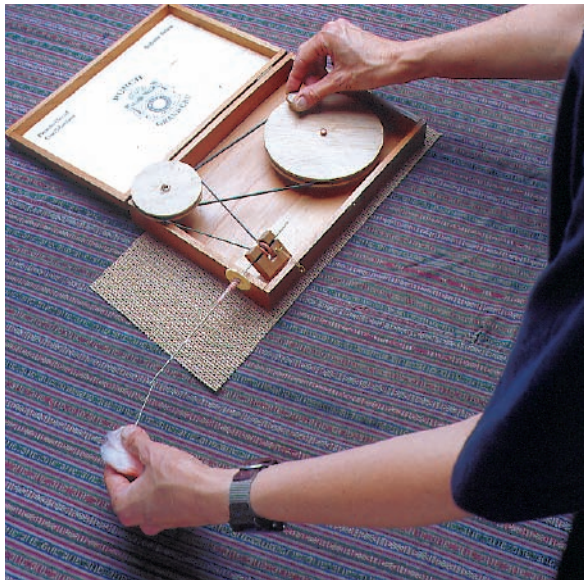
Cut two pieces of scrap wood, each about 1" × 3/4" × 2" (2.5 × 2 × 5 cm). Drill a 3/16" (5 mm) hole to fit the steel rod.

*One-box charkha plan, with Marilyn's measurements. Precise dimensions depend upon specific boxes.*

Measure and cut steel rod for mounting wheels. The rod should go from the bottom of the hole in the wood up through the wheel. It shouldn't protrude from the top of the wheel; it should come out even, or a little short. Sand or file the cut edges.

Tap the rods into place in the holes in the wood, place the wheels on the rods, and then position the blocks in the bottom of the box to test the locations where you'll glue the blocks. Start with the large wheel; its edges should clear the sides of the box by about 7/16" (1.1 cm). Then try a location for the small wheel, checking the one-box and two-box layouts for options. The support block for the small wheel on mine was next to one side of the box and about 1" (2.5 cm) from its top. Make sure





You spin off the point of a charkha's spindle. The device is like a turbocharged hand-spindle, and is well suited for spinning fine, high-twist yarns. Underneath this one-box charkha is the textured shelf liner Marilyn uses to keep the charkha from sliding around when she spins—a good tip for any small wheel.

the wheel clears the side of the box.

Make pencil marks showing where the support blocks go. Remove wheels and rods from blocks (you may need a pliers for the rod) and glue the blocks in place, clamping them in place or weighting them with something heavy.

## Spindle

I used a knitting needle for the spindle. Sizes 0 and 1 (2.25 and 2.5 mm) work well because they're stiff enough not to bend and thin enough to suit a fine yarn.

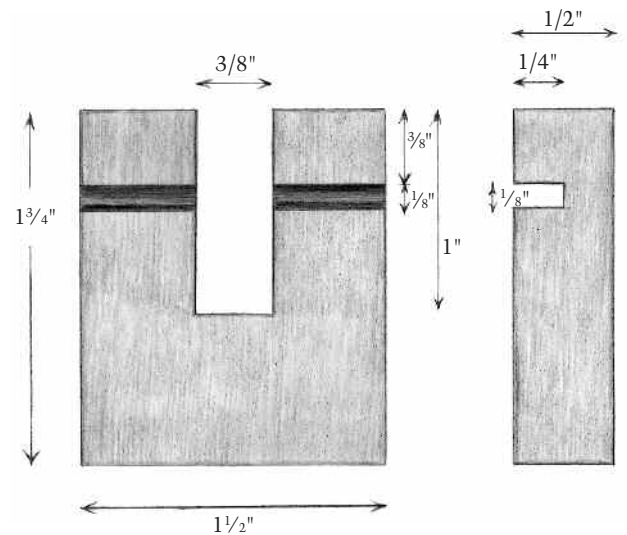
For a spindle pulley, I used two concave buttons glued together. On buttons with shafts, there's a center hole which you can reveal by cutting and removing the shaft. It's nice when the spindle fits tightly into the pulley, but you may have to redrill the hole in the button to make it fit. If the hole's a little too big, use superglue. For a yarn stop, use a larger button.

I like to use pearl buttons because they're a natural material and the hole can be enlarged with a needle file.

Most charkhas from India come with three spindles.

## Spindle support

See the full-size pattern for the spindle support; the center open area needs to be



**Full-size plan for spindle support.** Check dimensions against your box and spindle before making this piece.

big enough for the spindle pulley to rotate freely and the support has to clear the side of the box.

For a tensioning device, I use two eye hooks, one on the spindle support and one on the box. Depending on your design, you may need to locate the hooks and the hinge of the spindle support in various places. See the drawings on page 72 for some options. Tension is provided by a tiny spring or rubberband stretched between the eye hooks. Rubberbands from the orthodontist work great on one of my wheels.

## Finishing up

Add the driving knob to the large wheel; I used a drawer pull. On the one-box charkha, I had to sand down its top so the box would close.

Use the waterbase sealer to coat the box and all the parts. This helps keep the wheel clean.

Fit O-ring drive bands connecting (1) large wheel and pulley on small wheel and (2) small wheel and pulley on spindle.

Take it for a test spin.